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ABSTRACT

This study assessed the impact of two educational strategies: text only versus text plus small group discussion, among two groups of third-year internal medicine clerkship students in a preventive cardiology course. The course was a required, 12-week Internal Medical clerkship at the University of Texas Medical Branch. The first group reviewed written information in the course syllabus consisting of content-specific information plus a clinical case presentation developed by a physician. The second group received the same written material plus a 1-hour case-based group discussion. These students met in group of about 12 with a physician acting as a facilitator. An observer documented the consistency of the student experiences across groups. These two educational strategies were compared in two consecutive clerkship cohorts during the 1993-94 academic year. The impact of the methods was assessed using two evaluation methods: a survey of student knowledge and a performance-based objective structured clinical examination conducted at the end of the clerkship. Analysis suggested an overall improvement in knowledge of preventive cardiology for all students by the end of the clerkship, regardless of educational technique. (Contains 16 references.) (JB)

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Comparison of Two Educational Strategies in Teaching Preventive Cardiology

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OBJECTIVES:

Although practicing physicians and medical students generally have positive attitudes regarding the need to address preventive cardiology (McBride, 1990), they often report gaps in education and lack of confidence in their skills (Mann and Putman, 1988; Kashani, et al., 1993). This training and dissemination of information pertaining to preventive cardiology within the medical school curriculum can be accomplished in a variety of ways. The impact of two educational strategies, i.e., text only versus text plus small group discussion, was assessed among two groups of third-year Internal Medicine clerkship students.

PERSPECTIVES/THEORETICAL FRAMEWORK:

Cardiovascular disease (CVD) has been the leading cause of death in the United States throughout the twentieth century (NCHS, 1988). However, CVD mortality has declined over the past 25 years primarily due to changes in personally modifiable risk factors (Fries, 1980; Stern, 1979; Kuller, et al., 1986). Physicians' knowledge about these risk factors and their attitudes toward disease prevention impact upon the nature and direction of their patient care. Given that over seventy percent of adults in the United States have at least one contact annually with a physician, there are opportunities for disease prevention to occur (Ockene, et al., 1990).

With the current emphasis on primary care, many physicians are recognizing the value of prevention and understand the role it can play in their patient care. Unfortunately, many practicing physicians are faced with numerous impediments to practicing preventive medicine. Among those barriers are their training in the current medical model, focused on cure rather than prevention; the increase in specialization over primary care; and a reimbursement system which has not favored preventive measures (Nickens and Petersdorf, 1990). To impact this lack of preventive medicine

training for future physicians, the Association of American Medical Colleges (AAMC) produced a report entitled "Physicians for the Twenty-First Century: Report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine"(GPEP, 1984). One of the recommendations of the GPEP report was that "medical students' general professional education should include an emphasis on the physician's responsibility to work with individual patients to promote health and prevent disease."

Preventive cardiology education preceded this recommendation by awarding Preventive Cardiology Academic Awards (PCAA) to several U.S. medical schools (Stone, 1990). These awards required a commitment from each school to develop or enhance their program for teaching preventive cardiology. As a result of these incentives and a recognition of the nature of the future practice of medicine, most medical students received some information on prevention of heart disease during their medical school curriculum (Kashani, Kaplan, Rupp, et al., 1993). This knowledge focuses on cardiovascular physiology, biochemistry and pathology; clinically oriented courses in epidemiology and health promotion; and through clinical clerkship and ambulatory experiences (Eaton, et al., 1990). In addition to this knowledge base, the effective practitioner must also master the skills necessary to modify risk factors in patients at risk for cardiovascular disease. These skills include communicating effectively with patients and assessing relevant behavioral, psychological, and social risk factors.

The Preventive Cardiology Academic Award (PCAA) at the University of Texas Medical Branch was designed to enhance the curriculum in cardiovascular disease prevention at this institution at multiple sites within the curriculum. As part of this larger project, two educational strategies were used in the third year Internal Medicine Clerkship to promote students' knowledge

about preventive cardiology and to enhance their effectiveness in identifying relevant risk factors during patient interviews.

METHODS AND DATA SOURCE:

As part of a Preventive Cardiology Academic Award program, two teaching strategies were employed with third year medical students during their required twelve-week Internal Medical (IM) clerkship. The first strategy included providing written information in the course syllabus. This material consisted of content-specific information concerning cardiovascular diseases, epidemiology, risk factors, and prevention techniques plus a clinical case presentation developed by a physician. The case presentation consisted of a description of a patient presentation and a discussion of the implications for treatment and prevention. The second strategy included the previously described written material plus a one hour case-based group discussion. Students met in groups of approximately twelve with an Internal Medicine physician acting as a facilitator. In addition, an observer in each room documented the consistency of the student experiences across groups. Information from these observers suggested that not only were content issues within the written materials discussed, but so were physician skills relating to elicitation of cardiac risk factors from patients. These two educational strategies were compared in two consecutive IM clerkship cohorts during the 1993-1994 academic year.

The impact of these teaching methods was assessed using two evaluation methods. Students were requested to complete an 18-item Preventive Cardiology Student Survey that sampled the student's knowledge about preventive cardiology via multiple choice questions. This instrument was developed from The Preventive Cardiology Testbank (University of Washington) software, a preventive cardiology item-bank. The survey was used as a pre- and post-clerkship measurement

of students' knowledge.

Pre- and post-intervention knowledge scores were computed for each student. These scores reflected the number of items the student answered correctly. For those students completing both pre and post surveys, an improvement score was calculated by subtracting the number of correct answers on the pre survey from the number of correct answers on the post survey. Therefore, positive numbers indicated an increase in the number of correct responses on the post survey, negative numbers indicated a decrease, and zero indicated no change.

Students were also evaluated on their clinical performance during two cardiovascular-related stations in an Internal Medicine performance-based objective structured clinical examination (OSCE) conducted at the end of the clerkship. These were two four-minute stations: one, a focused history of a chest pain presentation and the second, an atherosclerotic cardiovascular disease (ASCVD) risk factor assessment. Scores for each of these stations were based upon a standardized patient completed checklist that reported students' data collection (twelve items) and facilitation of the patient encounter (six items). Since these stations were originally developed to assess several other clinical skills, only two of the items on the checklist were specifically related to preventive cardiology, including 1) Student asked about patient's history of smoking and 2) Student asked about patient's history of high blood pressure. Each item was scored as Done/Done Acceptably or Not Done/Not Done Acceptably.

In addition, each student-SP encounter from these two OSCE stations was videotaped and subsequently viewed by a trained observer. Observers assessed student collection of 35 items specifically related to preventive cardiology such as the patient symptoms, lifestyle behaviors, pertinent past medical history and family history. Each item was scored as: 1) Student Asked in

Context, 2) Student Asked, but Not in Context, 3) Patient Volunteered Information, or 4) Information Not Obtained.

RESULTS:

In the text only group, 43 students (reflecting an overall response rate of 80%) provided an identifier and completed both pre- and post-intervention knowledge surveys. In the text plus small-group discussion set of students, 32 provided an identifier and completed both surveys (reflecting an overall response rate of 71%). Identifiers were needed to link pre- and post-intervention data from the same student. When identifiers were not provided, it was impossible to assess improvement from pre- to post-intervention for a particular student. Thus, comparisons of improvement are based on 75 medical students. Improvement for the first group ranged from -3 to 8 points, while for the latter it ranged from -4 to 8 points. A comparison was made via the t-test method and results suggested that no significant differences existed between the two groups of students regarding their mean improvement from pre- to post-intervention on their knowledge scores.

Both intervention groups were combined. This permitted a comparison of number wrong on the knowledge questionnaire from pre- (N=95) to post-intervention (N=84) to be made via t-test. Analyses revealed a highly significant difference ($p < 0.0001$) between the two with the post-intervention group having fewer wrong responses (mean=5.9, S.D.=2.0) than the pre-intervention group (mean=7.3, S.D.=2.1). A 2 x 2 ANOVA was performed to further elucidate these relationships. Results confirmed the t-test findings regarding the improvement from pre- to post-intervention. That is to say, a statistically significant difference was found for the comparison of pre- and post-intervention data ($p < 0.0001$) and no difference was found for the comparison of the two intervention groups ($p = 0.09$). Table 1 summarizes these findings. These analyses suggested

an overall improvement in knowledge of preventive cardiology for all students by the end of the clerkship, regardless of educational technique.

Table 1. Comparison of Preventive Cardiology Knowledge Questionnaire data.

Group	N	Min	Max	Mean	S.D.	F-value*	p value*
Pre-intervention	95	2	13	7.3	2.1	22.62	< 0.0001
Post-intervention	84	2	10	5.9	2.0		
Text Only	100	2	13	6.4	2.2	2.9	0.09
Text & Small Group	79	2	11	6.9	2.1		

* Statistics from 2 x 2 ANOVA. Overall ANOVA F-value=12.76, $p < 0.0001$.

Students in the text only group having OSCE scores for the two stations numbered 54, while there were 43 in the text with discussion group. Those in the first group had OSCE scores on the chest pain station ranging from 75 to 100 with a mean of 93.8 and scores on the ASCVD risk factor station ranging from 62 to 100 with a mean of 83.6. Scores for those in the text plus discussion group ranged from 72 to 100 for the chest pain station (mean=93.1) and 42 to 100 for the ASCVD station (mean=84.6). There were no statistically significant differences between groups.

Preventive Cardiology Checklist data obtained from videotape review of the two OSCE stations were compared for these two groups. Response categories were collapsed to facilitate analyses. Responses of "Student Asked in Context" and "Student Asked, Not in Context" were collapsed to one category of "Student Asked." "Patient Volunteered" and "Information Not Obtained" were reduced to one category of "Student Did Not Ask." Results from the Chest Pain station indicated that those students participating in the text plus discussion intervention (N = 43) asked numbers of items from this preventive cardiology checklist similar to those students from the text only intervention group (N = 51), 17.4 and 16.9 mean items, respectively. Similar results were found for the ASCVD Risk Factor Appraisal station: a mean of 10.0 items asked in the written material plus discussion group, and a mean of 9.9 for the text only group. Although individual items

from the checklist were investigated for differences between groups, no significant results were found.

LIMITATIONS:

Response rates for the students completing identified pre- and post-intervention PC knowledge surveys ranged from 80 to 71 percent. While 80 percent is an acceptable rate, it must be recalled that a higher response rate for any pre- or post- group was higher due to the number of non-identified and/or non-paired surveys.

Students may have acquired knowledge or experience regarding preventive cardiology throughout the IM clerkship in addition to the educational interventions. Since it was assumed that these would have been random occurrences, no systematic attempt was made to document nor control for these acquisitions.

The mean number of questions answered correctly on the Preventive Cardiology Knowledge Questionnaire increased 1.4 from pre- to post-intervention. While at first glance, this may not appear to be a strong difference, it is a nearly a thirteen percent improvement.

IMPORTANCE:

These data suggest that the single small-group case-based discussion was equally effective as the simple written material as measured by a knowledge questionnaire or a performance-based examination. It is possible that these measures were not sufficiently sensitive to discriminate between subtle differences in students' knowledge and performance. However, both outcome measures are typical of the evaluation process for third-year Internal Medicine students at this institution and are felt to be a valid representation of student skills.

It was anticipated that students in the text plus small group discussion would ask a greater

number of questions pertaining specifically to cardiovascular risk factors in two cardiology-related stations of an OSCE. However, scoring on the Preventive Cardiology Checklist did not differ for the two groups. It may be that more than one exposure to data regarding cardiovascular risk factors is needed to produce a change in medical student history-taking skills as measured by the checklist.

It was noted, though, that students did improve their knowledge from pre-intervention to post-intervention on the knowledge survey. Also, as in other medical student curriculum, CVD content related to epidemiology, biostatistics, and health promotion models typically overshadows any clinical skill training in that area (Vanderschmidt, Koch-Weser, Woodbury, 1987). It is encouraging that regardless of the teaching method, students can and do learn preventive cardiology.

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